My understanding of Supervised Learning and Loss Functions

Under Machine Learning, there is a huge subtype called Supervised Learning. Supervised Learning is a type of learning where the model is trained on a labelled dataset meaning each input(feature) has a corresponding output(label/value). The model learns the relationship between these inputs and outputs and then later when new unseen data is given it predicts output.

There are two types of supervised learning: Regression and Classification.

1. ***Regression:*** In this type of model, a curve or a line is fitted to best describe the relationship between the input features and output values. Thus, it predicts a continuous numeric value as output for new data.
2. ***Classification:*** In this type of model, it learns decision boundaries that separate the inputs into groups or classes. Thus, it predicts the most likely class as output for new data.

In Supervised Learning, Loss functions are mathematical functions that quantify the difference between the predicted and the actual values, which are incredibly helpful during training phase. There are different types of Loss functions for different models. Most common are Mean Squared Error (MSE), Mean Absolute Error (MAE) for regression losses and Cross-Entropy Loss (Log Loss) for classification losses.

***Mean Squared Error (MSE):*** It is the mean of square of difference between the actual values and predicted values for all the datapoints in the dataset. Large errors are given more weight as we are squaring.

***Mean Absolute Error (MAE):*** It is the mean of absolute value of difference between the actual values and predicted values for all the datapoints in the dataset. It is more stable in a noisy dataset.

***Cross-Entropy Loss (Log Loss):***  It is the mean of the negative sum of true label times the logarithm of predicted probability and one minus true label times the logarithm of one minus predicted probability.

It measures how far off the predicted probabilities are from true labels.